TAXONOMIC EVALUATION AND REDESCRIPTION OF *ANASPIDOGLANIS AKIRI* (RISCH, 1987) (SILURIFORMES: CLAROTEIDAE)

by

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ABSTRACT. - Since 1991, the African catfish *Auchenoglanis akiri* Risch, 1987 has been included in the genus *Parauchenoglanis*. An extensive re-analysis of the genera *Parauchenoglanis* and *Anaspidoglanis*, however, provides evidence for a closer affinity of *A. akiri* with the species of the genus *Anaspidoglanis*, which have a more depressed body and a different head morphology. Both biometric (using 294 specimens) and morphological (external and osteological) evidence supports this generic shift. Consequently, *Auchenoglanis akiri* has been transferred to the genus *Anaspidoglanis*, and given a redescription. The most important characters that allow to identify the species are: a thin skin covering the eyes, a premaxillary toothplate measuring 22 to 27% of the head length, a moderately broad snout, and completely fused branchiostegal membranes.

RÉSUMÉ. - Évaluation taxinomique et redescription de *Anaspidoglanis akiri* (Risch, 1987) (Siluriformes : Claroteidae).

Depuis 1991 le poisson-chat africain *Auchenoglanis akiri* Risch, 1987 est inclus dans le genre *Parauchenoglanis*. Une nouvelle analyse détaillée des genres *Parauchenoglanis* et *Anaspidoglanis* démontre une affinité plus proche de *A. akiri* avec les espèces du genre *Anaspidoglanis*, ayant un corps plus déprimé et une morphologie de la tête différente. Des caractères biométriques (sur 294 spécimens) et morphologiques (externes et ostéologiques) soutiennent ce transfert générique. Par conséquent, *Auchenoglanis akiri* est transféré dans le genre *Anaspidoglanis* et est redécrit. Les principaux caractères permettant l'identification de l'espèce sont : une peau recouvrant les yeux, une bande dentaire prémaxillaire mesurant 22 à 27% de la longueur de la tête, un museau assez large et des membranes branchiostèges complètement fusionnées.

Key words. - Claroteidae - *Anaspidoglanis* - *Parauchenoglanis* - Africa - Taxonomy.

The catfish family Claroteidae was erected by Mo (1991) for a group of African catfishes previously included in the Bagridae and was diagnosed on eight derived characters, including the presence of a prominent anterolateral laminar sheath of the palatine. Their external morphology is characterised by a moderately elongate body, dorsal and pectoral fins provided with a strong spine, and the presence of a clearly marked adipose fin (Teugels, 1996).

Mo (1991) recognized two subfamilies in the Claroteidae: Claroteinae, diagnosed by seven synapomorphies including the presence of an accessory toothplate on the palate; and Auchenoglanidinae, diagnosed by 15 derived characters, including the position of the anterior nostrils on the anteroventral side of the upper lip.

Auchenoglanidinae include six genera. Three of them, being closely related, have a rather complex history with regard to their nomenclature, i.e., *Auchenoglanis* Günther, 1865, *Parauchenoglanis* Boulenger, 1911 and *Anaspidoglanis* Teugels *et al*., 1991.

Teugels *et al*. (1991) published a generic review of *Auchenoglanis* and *Parauchenoglanis* and described the new genus *Anaspidoglanis*. Due to the erroneous redescription of one species [*Parauchenoglanis guttatus* (Lönnberg, 1895), type species] by Boulenger (1902), and thereby also of the whole genus (Boulenger, 1911), most *Parauchenoglanis* species (all except for *P. guttatus*) had to be placed in *Anaspidoglanis*. Teugels *et al*. (1991) also transferred all but two *Auchenoglanis* species to *Parauchenoglanis*. Differences between the three genera are mostly related to the length and the width of the supraoccipital process, and the width of the premaxillary toothplate. The genus *Anaspidoglanis* has since been revised by Mbega and Teugels (1998), who recognized two valid species: *A. macrostoma* (Pellegrin, 1909) and *A. boutchangai* (Thys van den Audenaerde, 1965), the former being the type species. *Parauchenoglanis* appeared to form a rather homogeneous group, except for one species, *P. akiri*.

Auchenoglanis akiri was described by Risch (1987), based on specimens originating from the Niger Delta in Nigeria. In the original description, the author mentioned the difficulties of assigning the new species to the correct genus, in view of the poorly known relationships between *Auchenoglanis* and *Parauchenoglanis*. He argued that the small, almost superior eye, covered with skin, referred to

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species of *Parauchenoglanis*, but that the fused branchiostegal membranes were characteristic for *Auchenogla-nis*. He also mentioned the intermediate size of the premaxillary toothplate. *Auchenoglanis akiri* was one of the species transferred to *Parauchenoglanis* by Teugels *et al*. (1991).

In this paper we present evidence to support the generic transfer of *Auchenoglanis akiri* from *Parauchenoglanis* to *Anaspidoglanis*. For sake of simplicity, the species will from here on be referred to as *Anaspidoglanis akiri*. For a taxonomic revision of the genus *Parauchenoglanis* we refer to Geerinckx *et al*. (in press).

MATERIAL AND METHODS

The results of this paper are based on a biometric and morphological analysis of four *Auchenoglanis*, 38 *Anaspidoglanis* and 252 *Parauchenoglanis* specimens. Specimens of all species included in these genera have been examined. Most specimens examined are housed in the collection of the Africa Museum in Tervuren, Belgium (Musée Royal de l'Afrique Centrale, MRAC).

Forty-five metric and seven meristic characters, as well as fifteen descriptive (non-numerical, morphological) traits were used. A complete list of the measurements is given by Geerinckx *et al*. (in press). Meristic traits involved fin ray counts (dorsal, pectoral, pelvic, anal and caudal fins) and counts of the serrae on the posterior and (distal) anterior side of the pectoral fin spines. The non-numerical features were: shape of the premaxillary toothplate, the relative length of the three barbels (stretched along the body), presence or absence of a rudimentary nasal barbel, position and morphology of the eyes, serration of the anterior side of the pectoral fin spine, position of the pectoral fin in relation to the pelvic fin, and of the pelvic fin in relation to the anal and dorsal fins, shape and position of the adipose fin, and outline of the caudal fin. A list of some important measurements is given in table I.

The biometric data were submitted to a principal components analysis (PCA) on the covariance matrix. The values of the meristic data were either too constant (fin ray counts) or proved to vary at random or depending on size (serrae on pectoral fin spine), and were therefore not submitted to PCA. For this last reason, three biometric variables were excluded from the PCA: the adipose fin length, the dorsal fin - adipose fin interdistance and the supraoccipital process - nuchal plate interdistance. Thus all PCA results presented here are based on 42 biometric variables.

The biometric data were log-transformed to reduce the effects of non-normality, and according to the generalized allometry equation (Jolicœur, 1963). As for the interpretation of PCA results, the first principal component reflects overall body size (Bookstein *et al*., 1985); the differences in shape (independent of size) are expressed on the next principal components. The most relevant reflection of variation in shape is thus obtained by plotting the second principal component against the third one.

An osteological study was done on 12 cleared and alizarin red S stained specimens, using the method of Hanken and Wassersug (1981), with trypsin being replaced by 5% KOH solution. The following specimens were used: *Anaspidoglanis macrostoma*: MRAC 95-19-P-780 (81 mm SL) (Fig. 3A); *A. boutchangai*: MRAC 91-79-P-283 (71 mm SL) (Fig. 3B); *A. akiri*: MRAC 88-43-P-308 (61 mm SL) (Fig. 3C); *Parauchenoglanis balayi*: MRAC 91-57-P-1019 (74 mm SL) (Fig. 4A), MRAC 93-108-P-396 (53 mm SL), MRAC 93-41-P-1262 (109 mm SL); *P. guttatus*: MRAC 91-67-P-169 (63 mm SL); *P. punctatus*: MRAC P.131264 (76 mm SL) (Fig. 4B), MRAC P.38072 (94 mm SL); *P. ngamensis*: MRAC P.161714 (103 mm SL); *P. longiceps*: MRAC 73-29-P-1457 (163 mm SL); *P. pantherinus*: MRAC 93-82-P-401 (176 mm SL). Only *P. balayi* and *P. punctatus* are shown in figure 4; all cited characteristics have been verified on the other examined *Parauchenoglanis* specimens.

The nomenclature used in this paper already takes into account the results of the revision of the genus *Parauchenoglanis* (Geerinckx *et al*., in press).

Table I. - Measurement abbreviations.

AdCID	Adipose Fin - Caudal Fin Interdistance
AdFH	Adipose Fin Height
AnCID	Anal Fin - Caudal Fin Interdistance
ANID	Anterior Nostrils Interdistance
DFBL	Dorsal Fin Base Length
DSL	Dorsal Fin Spine Length
EMdBL	External Mandibular Barbel Length
IMdBL	Internal Mandibular Barbel Length
IOD	Interorbital Distance
MnCPH	Minimum Caudal Peduncle Height
MW	Mouth Width
MxBH	Maximum Body Height
MxBL	Maxillary Barbel Length
OD	Orbital Diameter
PHL	Prehyoid Length
PmxTW	Premaxillary Toothplate Width
PNID	Posterior Nostrils Interdistance
POL	Postorbital Skull Length
PPvL	Prepelvic Length
PvBH	Pelvic Body Height
SkH	Skull Height
SkL	Skull Length (= Head Length)
SL	Standard Length

RESULTS AND DISCUSSION

Biometry

When comparing the external morphology of *Anaspidoglanis akiri* with that of the *Parauchenoglanis* species, important differences can be observed. For instance, *A. akiri* has small eyes, covered with skin and situated dorsally on the anterior part of the skull, whereas all *Parauchenoglanis* species generally have larger eyes, not covered with skin and placed dorso-laterally halfway on the skull. The condition in *A. akiri* is exactly the same as in the two known *Anaspidoglanis* species. This observation was already made by Risch (1987), when originally describing the species in the genus *Auchenoglanis*. Notice that at that time *Anaspidoglanis macrostoma* and *A. boutchangai* were erroneously included in *Parauchenoglanis*, a situation rectified by Teugels *et al*. (1991). Another difference is seen when looking at the shape of the snout, which is rather narrow and pointed in all *Parauchenoglanis* species, but broad and flat in *Anaspidoglanis akiri* and *A. macrostoma*, and even extremely flat in *A. boutchangai*. The mouth opening and the premaxillary toothplate are broader in the latter three species.

A PCA of 42 measurements on all examined specimens yields the following factor loadings for the first three axes: PC1: eigenvalue 806 (94.5% of total variance, i.e., variance in size), PC2: eigenvalue 15 (1.8% of total variance), PC3: eigenvalue: 8.5 (1.0% of total variance). Four distinct clusters are visible along the second principal component axis (Fig. 1), which is merely defined by the premaxillary toothplate width (PmxTW) (Tab. II). The first cluster (left side of graph) has a PmxTW of more than 50% skull length (SkL), the second cluster has values between 20 and 50% SkL, the third and largest cluster has values between 7 and 20% SkL, the fourth cluster (right side of graph) has a PmxTW of 7% SkL or even less.

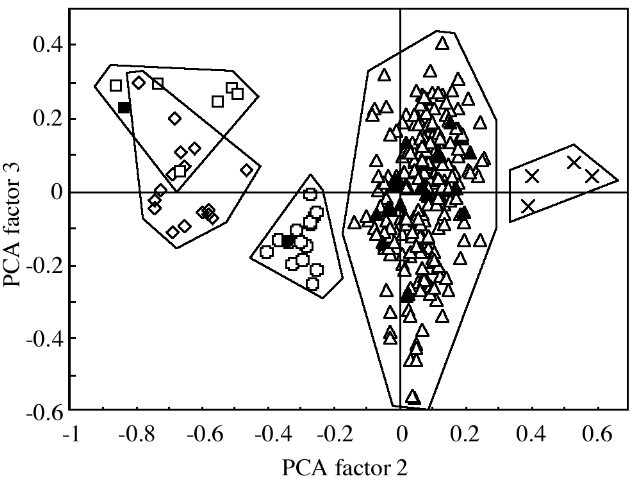

Figure 1. - Plot of principal component two (PCA factor 2) and three (PCA factor 3) scores of a principal component analysis of 42 log-transformed biometric data for 294 specimens. □ = *Anaspidoglanis boutchangai* (■ = holotype); ◇ = *A. macrostoma*; ○ = *A. akiri* (● = holotype); △ = *Parauchenoglanis* spp. (▲ = type specimens of all *Parauchenoglanis* species); × = *Auchenoglanis* spp.

The first cluster consists of *A. macrostoma* and *A. boutchangai* specimens from the Nyong, Ntem, Ogowe, Kouilou and Congo River basins. The second cluster, including all *A. akiri* specimens, originates from the Niger Delta and some adjacent rivers in South Nigeria. The third cluster is present in a vast region, stretching from Nigeria to Botswana. The type specimens of all *Parauchenoglanis* species are found in this group. The fourth cluster consists of the four *Auchenoglanis* specimens.

A PCA on the specimens of the first and second clusters (excluding the large *Parauchenoglanis* cluster and the four *Auchenoglanis* specimens) reveals a splitting of the first cluster (Fig. 2): the group in the lower left quadrant includes all *A. boutchangai* specimens; the other group, including all *A. macrostoma* specimens, is well separated from it along the second PC axis, but shows an overlap with the second cluster of the first PCA (*A. akiri* specimens). Factor loadings for this PCA are: PC1: eigenvalue 112 (94.5% of total variance, i.e., variance in size), PC2: eigenvalue 2.6 (2.2% of total variance), PC3: eigenvalue 1.3 (1.1% of total variance). The variables with the highest scores for this PCA are shown in table III; the adipose fin height (AdFH) and dorsal fin spine length (DSL) contribute most to the separation of *A. boutchangai* along the second PC axis.

In view of these results it can be concluded that *A. akiri* probably does not belong to the genus *Parauchenoglanis*, and appears to be closely related to the two known *Anaspidoglanis* species, and in particular to *A. macrostoma*.

Morphology

As already mentioned above, the premaxillary toothplate width (PmxTW) in *Parauchenoglanis* is significantly smaller compared to that in *Anaspidoglanis* (Figs 3, 4). Related to this, the two tips of the forked rostral part of the mesethmoid diverge more in *Anaspidoglanis* (angle between the tips exceeds 90°) than in *Parauchenoglanis* (angle

Table II. - Variables with the highest scores for the PCA using 42 log-transformed biometric variables for 294 specimens. For abbreviations see table I.

Factor 2		Factor 3	
PmxTW	-0.5811	MxBL	-0.4880
DSL	0.2899	EMdBL	-0.4223
AdCID	0.2747	IMdBL	-0.4013
SPDFID	-0.2708	AdCID	0.3874
MW	-0.2548	AdFH	-0.3186
ANID	-0.2307	SPDFID	0.1503
OD	0.2294	AnCID	0.1431

between the tips is less than 90°). Also, the mesethmoid encloses the anterior fontanel for at least one third of its length in *Anaspidoglanis*, which is clearly not the case in *Parauchenoglanis*. In contrast with *Anaspidoglanis* where the fontanel is spindle shaped, the fontanel in *Parauchenoglanis* is broader near its posterior end.

The shape of the lateral ethmoid clearly differs between both genera: in *Parauchenoglanis* it is about twice as long as broad; in *Anaspidoglanis* length and width are of similar size. In *Parauchenoglanis*, the lateral ethmoid has a large plate, which lies at the same level of the other cranial roof bones (Fig. 5A). In *Anaspidoglanis* the superficial plate is much reduced (Fig. 5C). With the exception of *A. boutchangai*, which shows some general specializations in relation to the extreme dorso-ventrally flattening of the head, the nasal bones in *Anaspidoglanis* bear a plate-like extension, which is completely lacking in *Parauchenoglanis* (where the nasal bone is a long and narrow tube).

The antorbital bone in both *Anaspidoglanis* and *Parauchenoglanis* bears the bifurcated rostral tip of the infraorbital canal. In both genera, the ventral branch of this canal is supported by an elongate process (Fig. 6A, C). However, a marked difference exists in the shape of the bone: in *Anaspidoglanis*, the bone is somewhat triangular, with its anterior margin being concave (thus in between the forked canals) and its posterior part being short and convex. In *Parauchenoglanis*, the anterior margin is no longer concave, as the two branches are interconnected by a small but substantial bony plate. Posteriorly, another plate is formed, which is well developed and spans almost up to the posterior half of the lacrimal bone. As a result, the antorbital bone in *Parauchenoglanis* is much more rectangular, compared to that in *Anaspidoglanis*.

Table III. - Variables with the highest scores for the PCA using 42 log-transformed biometric variables for the *Anaspidoglanis* specimens. For abbreviations see table I.

Factor 2		Factor 3	
AdFH	0.4579	OD	0.3640
DSL	0.4102	AdCID	-0.3418
IMdBL	0.2712	PNID	0.3134
MxBH	0.2520	PmxTW	0.3087
PvBH	0.2470	PHL	-0.2682
PmxTW	-0.2395	MxBL	0.2568
SkH	0.2390	DFBL	-0.2524
PNID	-0.1852	IOD	0.2343
IPvD	-0.1786	AnCID	-0.2234
OD	-0.1618	DSL	0.2164

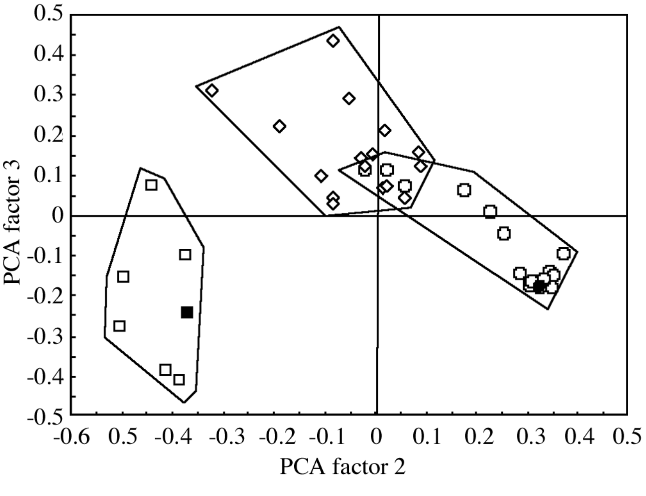

Figure 2. - Plot of principal component two (PCA factor 2) and three (PCA factor 3) scores of a principal component analysis of 42 log-transformed biometric data for 38 *Anaspidoglanis* specimens. □ = *A. boutchangai* (■ = holotype); ◇ = *A. macrostoma*; ○ = *A. akiri* (● = holotype).

The orbita is differently bordered in the two genera. In *Parauchenoglanis* the orbita is clearly bordered by the lateral ethmoid, the frontal, the sphenotic and the infraorbitals III and IV. The latter infraorbitals are even slightly curved, strictly following the ventral and posterior margin of the eye. In *Anaspidoglanis* the orbita is not that clearly demarcated, with the fourth infraorbital not being curved. The sphenotic forms a well-developed postorbital process in *Parauchenoglanis* for this purpose, which is also present in *Anaspidoglanis*, however much less pronounced (it is absent in *A. boutchangai*). The two genera are clearly distinct from each other in the way the infraorbital canal enters the sphenotic: in *Parauchenoglanis* it enters the sphenotic at the lateral tip of the postorbital process (Fig. 7A). In *Anaspidoglanis*, on the other hand, the infraorbital canal enters the sphenotic close to the suture with the frontal (Fig. 7C).

In the occipital region, some differences can be observed as well: in *Parauchenoglanis* the extrascapular bones are well developed, thus almost completely covering the dorsal process of the posttemporo-supracleithral bone (Fig. 7A). In *Anaspidoglanis*, however, the extrascapular bone is reduced, as the caudo-medial part appears to be lacking. As a result, the dorsal process of the posttemporo-supracleithral bone is partially exposed (Fig. 7C). The supraoccipital process in *Anaspidoglanis* is short and inconspicuous (Fig. 3); in *Parauchenoglanis* it is nearly as long as the body of the parieto-supraoccipital bone itself (Fig. 4). The supraoccipital process and the first nuchal plate (also called first predorsal scute) are palpable through the skin. This makes it possible to detect their interdistance. In *Anaspidoglanis* they are always well separated. In *Parauchenoglanis* the interdistance varies considerably, partly due to the fact that the first nuchal plate does not always ossify to the same extent. For example, significant differences were observed among the syntypes of *P. pietschmanni* (a junior synonym of *P. balayi*), or among the syntypes of *P. iturii* (a junior synonym of *P. punctatus*). The fourth parapophyses bear a deep lateral indentation in *Anaspidoglanis*, which is not the case in *Parauchenoglanis*.

Based on this overview of morphological differences between *Parauchenoglanis* and *Anaspidoglanis*, it seems clear that *Auchenoglanis akiri* Risch, 1987 actually is much more closely related to the other *Anaspidoglanis* species than to any *Parauchenoglanis* species. The following arguments can be given (see Figs 3C, 5B, 6B, 7B): the

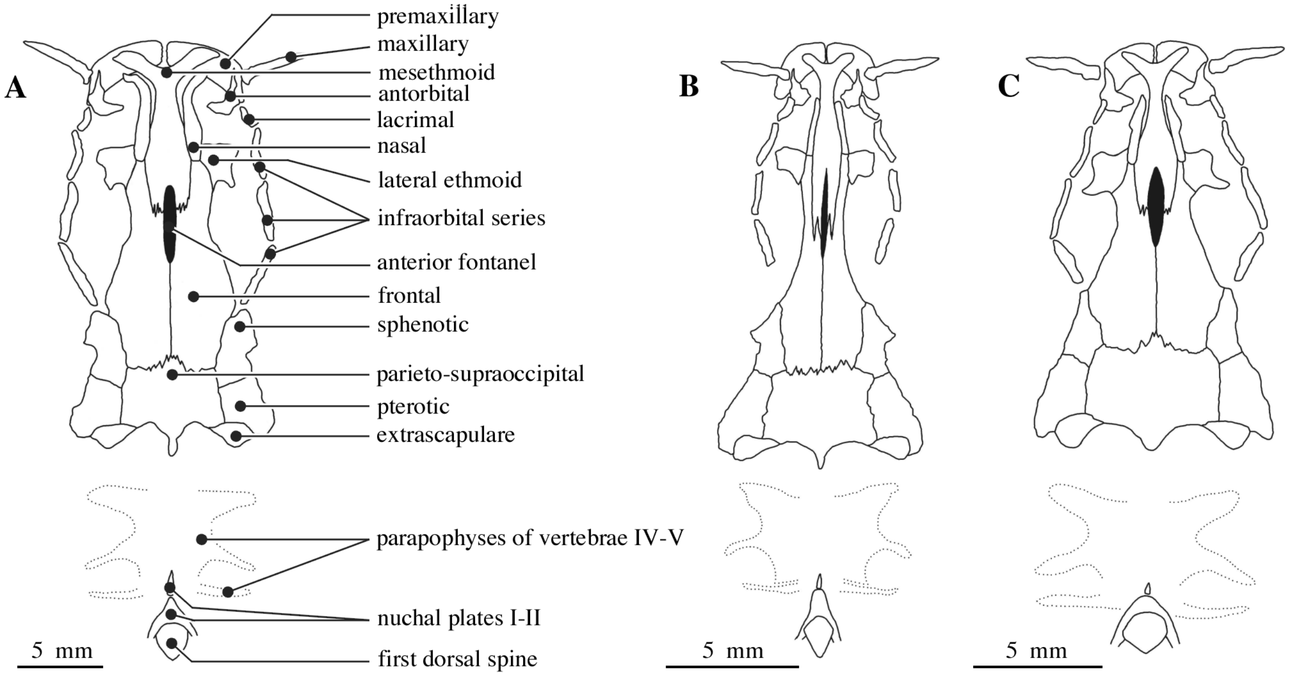

Figure 3. - Dorsal view of the neurocranium and the predorsal region. **A**: *Anaspidoglanis macrostoma*; **B**: *A. boutchangai*; **C**: *A. akiri*. The parapophyses of vertebrae IV and V are drawn in a dotted line.

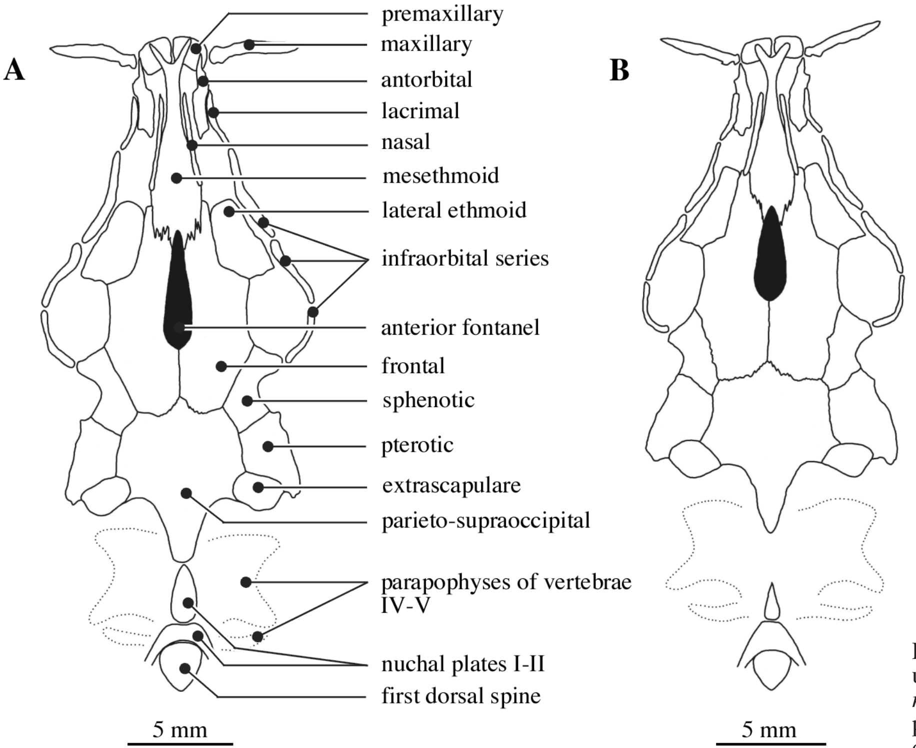

Figure 4. - Dorsal view of the neurocranium and the predorsal region. **A**: *Parauchenoglanis punctatus*; **B**: *P. balayi*. The parapophyses of vertebrae IV and V are drawn in a dotted line.

forked rostral tip of the mesethmoid is broad, the angle between the fork being more then 90°; the mesethmoid encloses the anterior half of the fontanel; the fontanel is spindle shaped; the lateral ethmoid is short and lacks the superficial plate; the nasal bone bears a plate-like extension; the antorbital bone has a concave anterior margin and lacks the plate-like extension posteriorly; the orbita is not well demarcated by the surrounding bones as the postorbital process of the sphenotic is lacking and the infraorbitals III and IV are not curved; the infraorbital canal enters the sphenotic close to the suture of that bone with the frontal; the extrascapular bone has a reduced caudomedial part and thus exposes a large part of the dorsal process of the posttemporo-supracleithrum; and the supraoccipital process is very small. All these traits not only suggest a close relationship of *Auchenoglanis akiri* Risch, 1987 with *Anaspidoglanis*, but also a very close relationship with *Anaspidoglanis macro-stoma* (with regard to *A. boutchangai*).

As a result of the generic transfer of *Auchenoglanis akiri* to *Anaspidoglanis*, the following practical key to distinguish *Auchenoglanis*, *Anaspidoglanis* and *Parauchenoglanis* is proposed:

1a Posterior cranial bones well visible through the skin; large supraoccipital process in close contact (may even overlap) with the well developed, large first nuchal plate; caudal fin weakly emarginated .....*Auchenoglanis*

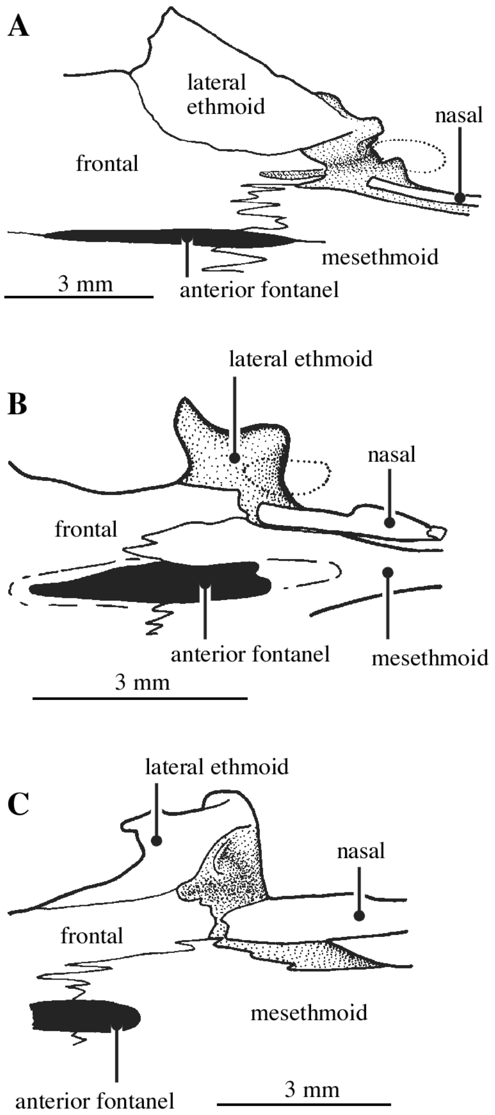

Figure 5. - Dorsal view of the preorbital region (left side) of the skull roof. **A**: *Parauchenoglanis punctatus*; **B**: *Anaspidoglanis akiri*; **C**: *A. macrostoma*.

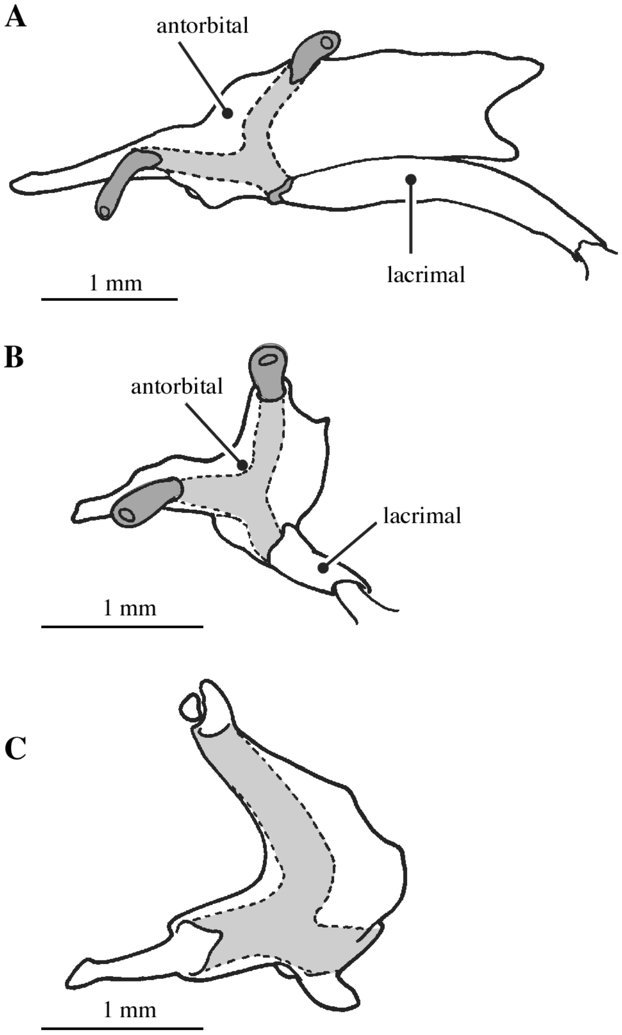

Figure 6. - Dorsal view of the antorbital bone (left side, anterior side to the left). **A**: *Parauchenoglanis punctatus*; **B**: *Anaspidoglanis akiri*; **C**: *A. macrostoma*.

1b Posterior cranial bones hardly visible through the skin; supraoccipital process longer than wide or very much reduced; process may or may not touch the rudimentary first nuchal plate; caudal fin rounded or straight..........2

2a Snout broad and flat; eye without free border (covered with skin) and placed on the dorsal side of head; broad premaxillary toothplate (minimum 20% of head length); supraoccipital process always well separated from first nuchal plate ....*Anaspidoglanis*

2b Snout neither broad nor flat; eye with free border (not covered with skin) and placed dorso-laterally on the head; premaxillary toothplate small and narrow (less than 20% of head length); supraoccipital process and first nuchal plate separated from each other, or touching.. *Parauchenoglanis*

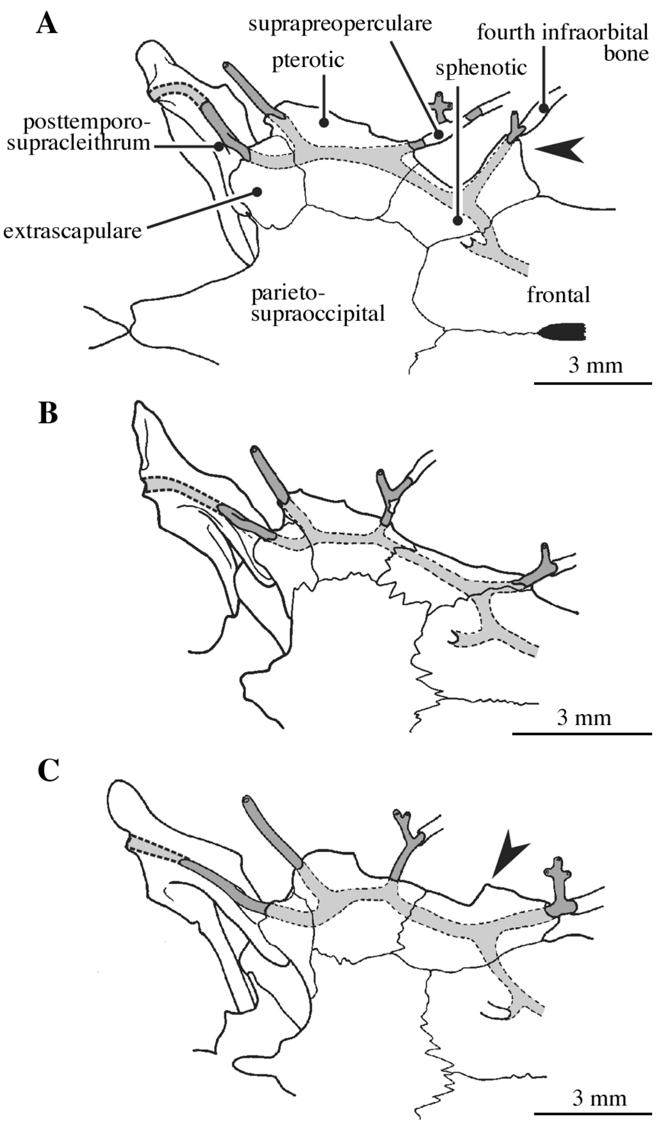

Figure 7. - Dorsal view of the otico-occipital region (left side) of the skull roof in: **A**: *Parauchenoglanis punctatus*; **B**: *Anaspidoglanis akiri*; **C**: *A. macrostoma* (Arrowhead indicates postorbital process).

For the identification of the species of the genus *Anaspidoglanis* the following key is proposed:

1a Head and body extremely depressed, with maximal body height 10 to 13% of standard length; 7 to 12 dorsal fin rays; 14 to 17 anal fin rays; 5 to 7 faint transverse bands on flanks present or absent in juvenile specimens, always absent in adults; dorsal, anal, pectoral and pelvic fins slightly transparent.........................*A. boutchangai*

1b Head and body moderately depressed, with maximal body height 16 to 25% of standard length; always 7 dorsal fin rays; 9 to 13 anal fin rays; dotted or banded colour pattern always present in juveniles, present or absent in adults..2

2a Maximal body height 16 to 18% of standard length; width of premaxillary toothplate 34 to 41% of head length; branchiostegal membranes not fused; 7 to 8 pectoral fin rays; pectoral fin usually not reaching the base of the pelvic fin ....*A. macrostoma*

2b Maximal body height 19 to 25% of standard length; width of premaxillary toothplate 22 to 27% of head length; branchiostegal membranes completely fused; 6 to 7 pectoral fin rays; pectoral fin always reaching the base of the pelvic fin ....*A. akiri*

A redescription of *Anaspidoglanis akiri* is given below.

ANASPIDOGLANIS AKIRI (RISCH, 1987), NEW COMBINATION

(Fig. 8C)

Auchenoglanis akiri Risch, 1987.
Parauchenoglanis akiri: Teugels *et al.*, 1991.

Diagnosis

Head and body moderately depressed (maximal body height 19 to 25% of standard length). Snout broad; premaxillary toothplate broad, measuring 22 to 27% of head length. Branchiostegal membranes completely fused.

Description

Based on fifteen specimens, including the holotype and the paratypes (see below). See table IV for metric and meristic data.

Eyes very small (6.5 to 10.5% of head length), situated dorsally on the first half of the head, and covered with a thin skin layer (lacking a free border around). Supraoccipital process and first nuchal plate both very small and well separated from each other. Short caudal peduncle, with a minimal height much larger than the horizontal distance between the bases of the adipose fin and the caudal fin. Pectoral fin reaching the base of the pelvic fin, or a little further. Maximum size recorded: 107 mm SL.

Numbers of fin rays: dorsal fin II.7, pectoral fin I.6-7, pelvic fin i.5, anal fin iii-iv.7-9, caudal fin 16-18.

Head and body brown or greyish; in juvenile specimens the flanks and the adipose fin bear relatively large spots with little space in between (reticulate pattern); in adults this pattern occasionally persists more or less, or disappears completely. Dorsal and caudal fins sometimes spotted; other fins always uniformly greyish.

Distribution

Anaspidoglanis akiri seems to be endemic to the Niger Delta and the neighbouring New Calabar and Bonny Rivers in southern Nigeria.

Specimens examined

Auchenoglanis: *A. biscutatus* (Geoffroy Saint-Hilaire, 1808): two spm. MRAC 73-12-P-367-368: Niger River near Mopti (Mali); 14°29'N, 4°13'W; coll. Matthes (156-160 mm SL); *A. occidentalis* (Valenciennes, 1840): two spm. MRAC 73-5-P-2815-2816: Casamance River at Kolda (Senegal); 12°53'N, 14°56'W; coll. Thys van den Audenaerde (154-184 mm SL).

Anaspidoglanis: *A. akiri*: fifteen spm. MRAC 84-15-P-9: Bonny River (Rivers State, Nigeria); 4°52'N, 7°02'E; coll. Akiri (holotype) (91 mm SL). MRAC 84-15-P-3-4: same data (paratypes) (2 spm, 88-92 mm SL). MRAC 87-24-P-124-125: New Calabar River (Nigeria); 4°55'N, 6°49'E; coll. Powell (2 spm, 59-85 mm SL). MRAC 87-24-P-126-131: New Calabar River (Nigeria); 4°56'N, 6°47'E; coll. Powell (6 spm, 32-74 mm SL). MRAC 88-43-P-307-308: New Calabar River (Nigeria); 4°53'N, 6°53'E; coll. Powell (2 spm, 61-69 mm SL). MRAC 93-39-P-73-74: Kwa Ibo River (Nigeria); 5°09'N, 7°40'E; coll. King (2 spm, 97-107 mm SL). *A. macrostoma*: sixteen spm. MRAC P.20423: Sangha River (Congo Brazzaville); coll. Baudon (58 mm SL). MRAC P.22532: Sankuru Lomela, Congo basin (Democratic Republic of the Congo); coll. Ghesquière (92 mm SL). MRAC P.173142-173143: between Ebam and Macora, Ntem basin (Equatorial Guinea); approx. 1°44'N, 11°18'E; coll. Roman (2 spm, 43-46 mm SL). MRAC 73-2-P-1811: Ebogo, Nyong River (Cameroon); 3°24'N, 11°28'E; coll. Thys van den Audenaerde (281 mm SL). MRAC 73-29-P-1465-1466: same data (2 spm, 207-233 mm SL). MRAC 73-29-P-1468: same data (172 mm SL). MRAC 73-29-P-1472: same data (125 mm SL). MRAC 75-56-P-896-897: Djaposten, Dja River (Cameroon); 3°36'N, 13°31'E; coll. Thys van den Audenaerde (179-193 mm SL). MRAC 95-19-P-779-780: tributary of Bitandé River, east of Nko'Elon (Cameroon); 2°23'N, 10°03'E; coll. Kamden Toham (2 spm, 81-105 mm SL). MRAC 95-42-P-239-241: Mpep River (Dja basin; Cameroon); 3°02'N, 12°52'E; coll. Forbin (3 spm, 137-185 mm SL). *A. boutchangai*: seven spm. MRAC 153160: rapids of Ngounié or Louetsié River (Gabon); coll. Boutchanga (holotype) (199 mm SL). MRAC 153161-153162: rapids of Ngounié or Louetsié River (Gabon); coll. Boutchanga (paratypes) (2 spm, 108-180 mm SL). MRAC 80-51-P-10-11: Ngounié or Louetsié

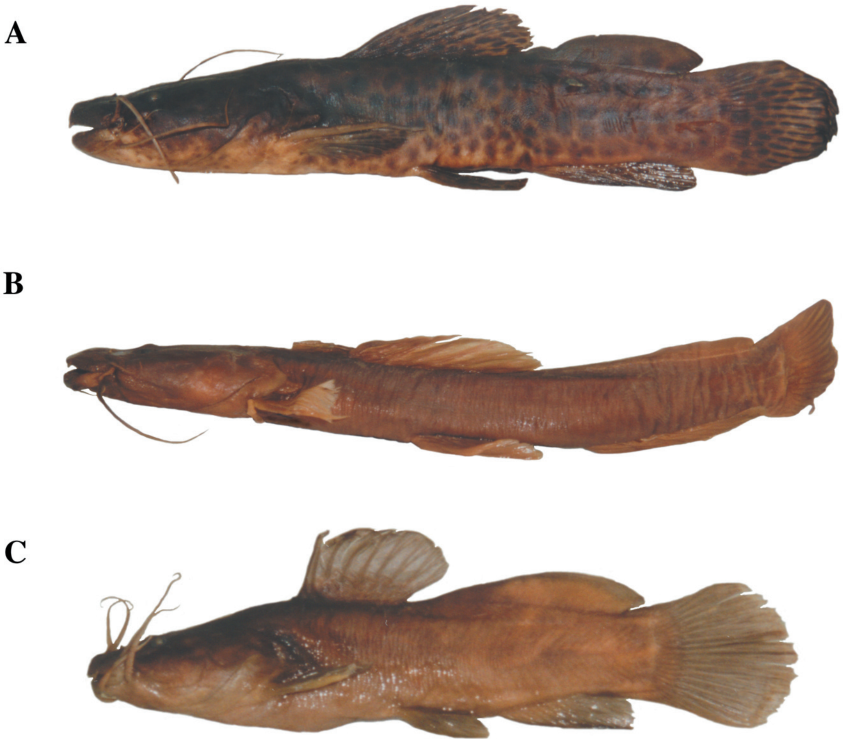

Figure 8. - **A**: *Anaspidoglanis macrostoma*, MRAC 73-29-P-1468, 172 mm SL; **B**: *A. boutchangai*, paratype, MRAC P.153161, 182 mm SL; **C**: *A. akiri*, holotype, MRAC 84-15-P-9, 91 mm SL.

	A. macrostoma n = 16	*A. boutchangai* n = 7	*A. akiri* n = 15
% MxBH/SL	17.21 ± 0.60	11.59 ± 0.67	22.14 ± 1.45
% PPvL/SL	54.43 ± 1.78	47.73 ± 2.70	53.70 ± 1.05
% MnCPH/SL	13.39 ± 0.14	10.60 ± 0.57	14.76 ± 0.97
% AdFH/SL	4.51 ± 0.67	2.58 ± 0.13	6.49 ± 0.87
% DSL/SL	10.81 ± 2.05	5.02 ± 1.37	11.86 ± 1.15
% SkH/SkL	52.93 ± 4.16	40.01 ± 3.75	67.06 ± 6.24
% POL/SkH	92.63 ± 8.30	138.72 ± 9.18	78.65 ± 6.74
% IOD/SkL	32.62 ± 2.42	21.22 ± 2.08	27.72 ± 3.09
% PNID/SkL	20.22 ± 2.01	15.52 ± 1.90	13.55 ± 0.73
% IMdBL/SkL	49.99 ± 9.71	45.30 ± 10.06	77.62 ± 8.15
% PMxTW/SkL	37.83 ± 1.86	29.93 ± 4.10	23.60 ± 1.51
% OD/SkL	10.87 ± 1.44	8.74 ± 1.48	8.50 ± 1.39
% SPNPID/SkL	28.05 ± 6.14	34.47 ± 3.80	20.01 ± 7.82
Number of soft dorsal fin rays	7	7-12	7
Number of soft pectoral fin rays	7-8	7-8	6-7
Total number of anal fin rays	9-12	14-17	11-13

Table IV. - Measurements and fin ray counts of the three *Anaspidoglanis* species. For measurements, the mean and standard deviation are given. Abbreviations are listed in table I.

River near Lebamba (Gabon); coll. Boutchanga (Roberts) (2 spm, 65-76 mm SL). MRAC 91-79-P-283-284: Kouilou-Niari River near Kibangou (Congo Brazzaville); 4°08'S, 14°08'E; coll. Roberts (2 spm, 70-71 mm SL).

Parauchenoglanis: *P. balayi* (Sauvage, 1879): 107 spm; *P. guttatus*: 39 spm; *P. punctatus* (Boulenger, 1902): 47 spm; *P. altipinnis* (Boulenger, 1911): 13 spm; *P. ngamensis* (Boulenger, 1911): 20 spm; *P. longiceps* (Boulenger, 1913): 8 spm; *P. buettikoferi* (Popta, 1913): 1 spm; *P. pantherinus* (Pellegrin, 1929): 12 spm; *P. ahli* (Holly, 1930): 5 spm. These include all type specimens. For collection numbers and other references of the *Parauchenoglanis* specimens we refer to Geerinckx *et al*. (in press).

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